CBCS SCHEME

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17CV42

Fourth Semester B.E. Degree Examination, Dec.2019/Jan.2020
Analysis of Determinate Structures

Time: 3 hrs. Max. Marks: 100

Note: Answer any FIVE full questions, choosing ONE full question from each module.

Module-1

1 a. Explain the different types of trusses, with neat sketches. **(04 Marks)**

b. State the assumptions made in the analysis of truss. **(04 Marks)**

c. Find the forces in all members of the pin jointed truss shown in Fig.Q1(c) by method of joints.

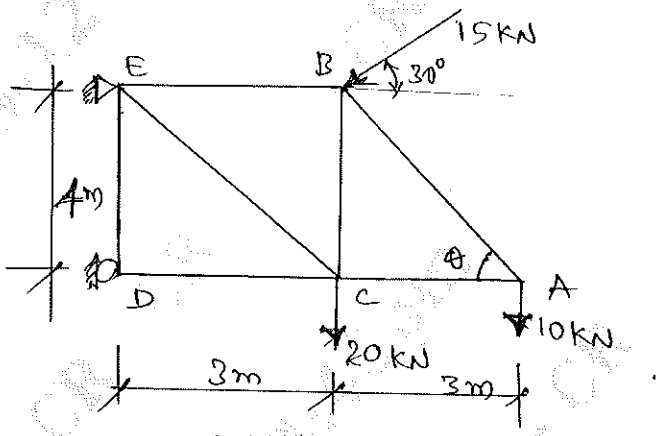

Fig.Q1(c) **(12 Marks)**

OR

2 a. Differentiate between statically determinate and indeterminate structures. **(04 Marks)**

b. Explain linear and non linear systems. **(04 Marks)**

c. Find the forces in the members EB, EC and DC by method of sections shown in Fig.Q2(c).

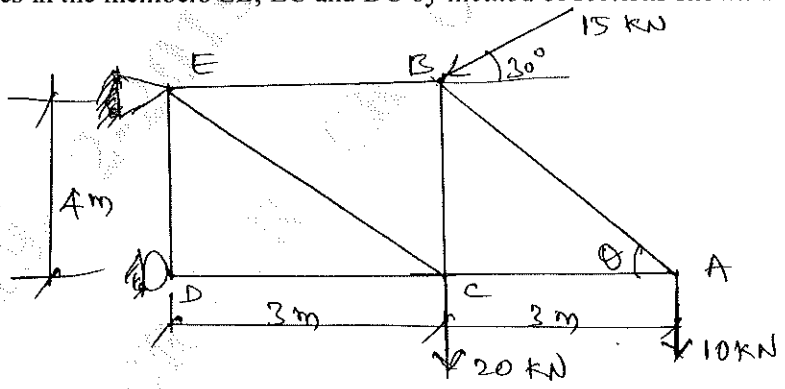

Fig.Q2(c) **(12 Marks)**

Module-2

3 a. State the first and second moment area theorems. **(04 Marks)**

b. Derive the Moment Curvature Equation for deflection. **(06 Marks)**

c. Determine slope and deflection for the simply supported beam subjected to point load at mid span shown in Fig.Q3(c).

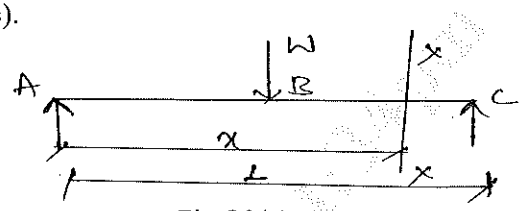

Fig.Q3(c) **(10 Marks)**

OR

4 a. Find the maximum slope and deflection at free end for the loaded beam shown in Fig.Q4(a) by Moment Area method.

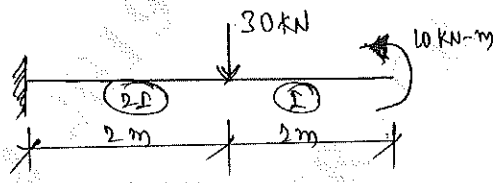

Fig.Q4(a) **(10 Marks)**

b. Determine the slope and deflection of the cantilever beam shown in Fig.Q4(b), using conjugate beam method.

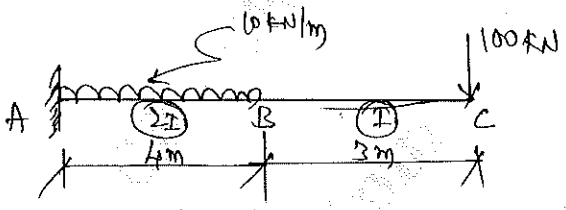

Fig.Q4(b) **(10 Marks)**

Module-3

5 a. Derive the expression for strain energy stored in an prismatic element subjected to pure bending moment. **(08 Marks)**

b. Determine the deflection at the center of the loaded simply supported beam as shown in Fig.Q5(b) by Castiglion's theorem.

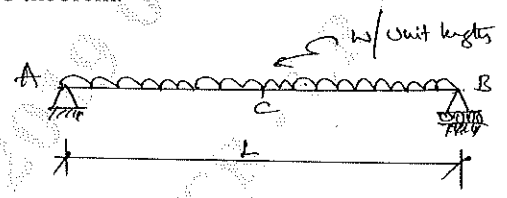

Fig.Q5(b) **(12 Marks)**

OR

6 a. Determine the horizontal displacement of the roller support end A of the frame shown in Fig.Q6(a), take EI = 8000 kN-m^2 by unit load method.

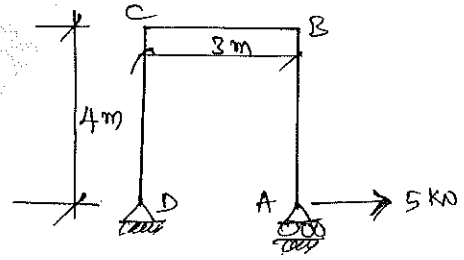

Fig.Q6(a) **(10 Marks)**

b. Determine the deflection at the load point for the beam shown in Fig.Q6(b) by using strain energy method.

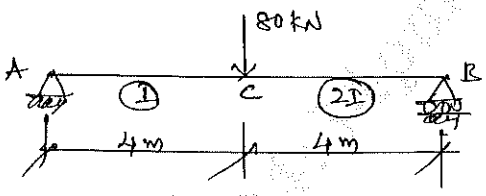

Fig.Q6(b) **(10 Marks)**

Module-4

7 a. Show that $L_C = L + \frac{8h^2}{3L}$ for a cable of span L and UDL of intensity W kN-m. **(08 Marks)**

b. A three hinged parabolic arch of span 24 m rise 6 m with hinged at abutments and at crown point. Arch subjected to a point loads of 50 kN and 150 kN at a distance of 8m and 20 m from left supports, determine, reactions at supports, radial shear and normal thrust at a distance of 6m both from left and right support and draw Bending Moment Diagram. **(12 Marks)**

OR

8 a. A cable of 20 m and dip 4m carries a UDL of 20 kN-m over the whole span, find the maximum tension in the cable and length of the cable. **(08 Marks)**

b. A three hinged parabolic arch is having a span of 36 m. It is subjected to UDL 30 kN/m from left support hinge to crown hinge. Determine the normal thrust, radial shear and bending moment at quarter span point located from left support. **(12 Marks)**

Module-5

9 a. What are the uses of influence line diagram? **(04 Marks)**

b. Draw the influence line diagram for shear force at a section for a simply supported beam subjected to single point load. **(06 Marks)**

c. Find the shear force at the section G for the loaded simply supported beam by using influence line diagram. Also find shear forces. [Refer Fig.Q9(c)]

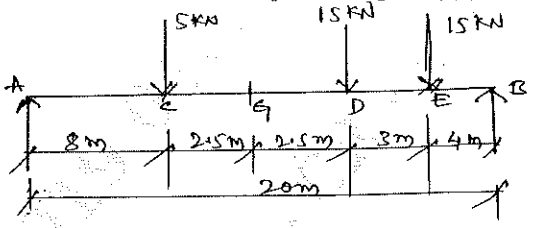

Fig.Q9(c) **(10 Marks)**

OR

10 a. Explain the procedure for generating influence line diagrams. **(04 Marks)**

b. Determine the influence line diagram for the forces in the members U_1U_2 U_2U_3 L_2L_3 U_2L_2 and U_2L_3 for the part truss as shown in Fig.Q10(b).

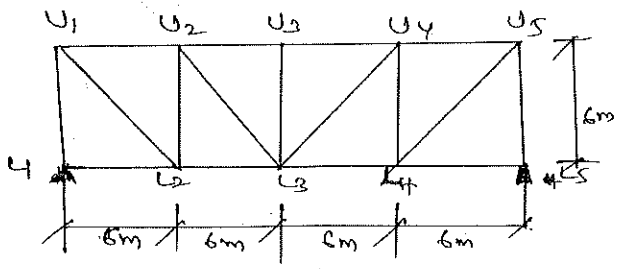

Fig.Q10(b) **(16 Marks)**

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